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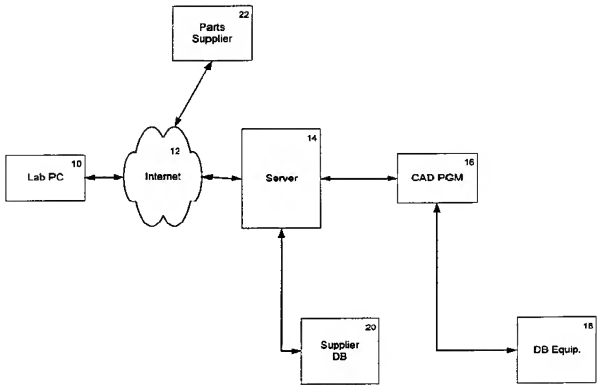
(54) Title: SYSTEM AND METHOD FOR THE PURCHASE OF SPARE PARTS



(57) Abstract: A system and method of using computer-aided design (CAD) and product images to visually orient a buyer with a particular piece of equipment. Engineering diagrams are stored in a database, retrieved to a server and displayed at a buyer's workstation. Using CAD, every component of a piece of equipment is identified and can be selected with a pointing means. By selecting a part in a diagram, a buyer obtains further information on that part in order to allow ordering of the part to take place. Layering representations in a CAD database allow the buyer to proceed through the database in increasing detail until a specific part is identified and isolated. Layers are cross-linked in the database to ordering information. Products and information a buyer may need in conjunction with the requested spare part are also presented to the buyer. When the buyer identifies a spare part to be ordered, select the part retrieves detailed ordering information including pricing. The buyer subsequently clicks on an "order" button to order the desired spare part. The system builds a database of spare parts that have been ordered. The database is indexed by other variables including the organization ordering, and the equipment to which the spare part belongs. Data mining can take place to assist in stocking the spare parts that are most likely to fail and to provide additional information to the designers of the scientific equipment regarding how to improve the quality of that equipment. Whether related parts will also be needed can be presented to the buyer.

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Title: SYSTEM AND METHOD FOR THE PURCHASE OF SPARE PARTS

Field of the Invention

This invention relates generally to the ordering of spare parts . More particularly, the present invention is an integrated system using CAD, diagrams, images, and figures to allow a buyer to visually order spare parts for equipment of all types.

Background of the Invention

In any setting where equipment is heavily used and tied to productivity, efficiency is predicated in large measure upon the functioning of various equipment. One such setting is a laboratory. When laboratory equipment ceases to function, test results are late and/or less tests are run. As a result, the laboratory loses profit. When a breakdown occurs, it is typically the scientist working in the lab, and not an engineer who designs equipment, who must order repairs and spare parts for the laboratory equipment that is no longer functioning. Thus buyers of spare parts for laboratory equipment are scientists and not engineers. Such personnel are not familiar with part numbers and specifications, yet often need to order spare parts. This is also true in many equipment-oriented settings.

Systems for purchasing spare parts are not particularly buyer friendly. For example, if a particular spare part is needed, a scientist may be faced with a wide variety of spare parts all of which have similar names. It is difficult, if not impossible for the scientist to precisely know what spare part is to be ordered and what is the precise part number and cost for that spare part.

Despite these problems, spare parts account for a large percent of the business of suppliers. Particularly in the field of laboratory instrumentation, supplying spare parts is a multi-billion dollar market. It is a highly profitable business, yet it does not get the same attention as the business of selling equipment. Thus, despite the lucrative nature of the spare parts business, few resources are directed toward supporting spare parts sales and identification for specific equipment.

Yet another issue arises with respect to providing spare parts for equipment. Since automated systems for ordering spare parts do not generally exist, the ability to review spare parts orders, to data mine that information and to determine weaknesses in equipment designs is lacking. With automated ordering systems lacking, the ability to cross-link data mined information is lacking as well.

What would be truly useful is a system and method for ordering of spare parts for laboratory equipment that is buyer friendly to the scientist or other less-knowledgeable buyer. Such a system would allow a scientist to identify the exact equipment that is being used in the work place, the precise part needed, its nomenclature, and the cost of the parts that are used in the specific equipment possessed by the buyer. Such a system would avoid the use of a parts catalog with all of the confusing information contained therein.

Summary of the Invention

It is therefore an objective of the present invention to increase the productivity of laboratories and other equipment-based work areas by simplifying the process of ordering spare parts for equipment.

It is a further objective of the present invention to reduce the cost of suppliers, thereby providing an efficient method for selling spare parts to laboratories.

It is still another objective of the present invention to allow scientists to order spare parts via the Internet.

It is a further objective of the present invention to remove ambiguity in the identification of spare parts for specific equipment.

It is still another objective of the present invention to be able to analyze the order rate of spare parts to determine those parts that are most likely to fail and to allow the stocking of those types of spare parts for future orders.

It is a further objective of the present invention to cross-link a spare parts order with other likely needed parts and/or information and present said parts and/or information to a buyer.

It is still another objective of the present invention to be able to analyze spare part ordering data to enhance the design of scientific instruments.

It is a further objective of the present invention to permit the ordering of spare parts via a graphical buyer interface to allow precise identification of parts.

It is a further objective of the present invention to integrate computer-aided design (CAD) with Internet linking to allow the ordering of spare parts.

It is still another objective of the present invention to integrate image files into an automated system for ordering spare parts.

These and other objectives of the present invention will become apparent to those skilled in the art from a review of the specification that follows.

The present invention comprises a system and method of using computer-aided design and other diagrams and potentially digital photography by a buyer to orient himself visually with a particular piece of equipment. Engineering diagrams are stored in a database and retrieved to a server and displayed over the Internet on a buyer's workstation. Using computer-aided design, every component of a piece of equipment is identified and is able to be designated by a pointing means such as a mouse, track ball or interactive method known in the art. By pointing and clicking on a particular part in a diagram, a buyer can obtain further information on that part in order to allow ordering of the part to take place.

The system allows buyers to navigate through any particular diagram, enlarging or decreasing the view of the part so that a specific part can be precisely identified.

Various layers of representation are present in the CAD database so the buyer can proceed through sequential layers of the database in increasing detail until a specific part is identified and isolated.

The various CAD information and layers are cross-linked in the database to ordering information such as the identification of the source of the spare part and the price. Specific products or information a buyer may also need in conjunction with the requested spare part are also presented to the buyer for suggestive sale. Once a buyer identifies a spare part to be ordered, the buyer simply clicks on the spare part and retrieves detailed information on the spare part to be ordered including its price. The buyer subsequently clicks on an "order" button to order the desired spare part.

The database of the present invention comprises many different types of equipment with sequentially increasingly detailed layers of information about the parts that comprise the individual piece of equipment. Over time, a database of spare parts that have been ordered is accumulated. This database is kept based on a spare part ordered, organization ordering a spare part, and the equipment to which the spare part belongs. In this fashion, various "data mining" can take place to assist in stocking the spare parts that are most likely to fail and to provide additional information to the designers of the scientific equipment regarding how to improve the quality of that equipment. Further, whether related parts will also be needed can be presented to the buyer.

Other features and functions of the present invention will become apparent to those skilled in the art from a review of the figures and detailed description that follows.

Brief Description of the Figures

Figure 1 illustrates the overall architecture of the present invention.

Figure 2 illustrates the communications sequence of the present invention.

Figure 3 illustrates a typical CAD presentation to the laboratory workstation.

Figure 4 illustrates a typical parts list.

Figures 5A and 5B illustrate the operation of one embodiment of the present invention

Detailed Description of the Invention

As noted above, the present invention comprises a system and method for ordering parts for equipment. It will be appreciated by those skilled in the art that techniques of the present invention are applicable to literally any equipment where a buyer desires to order spare parts for equipment. For purposes of this application, laboratory equipment will be discussed. However, as noted above, other types of equipment will also be served well by the present invention.

Each laboratory has a number of different types of equipment which may, from time to time, require repairs. When this is the case, laboratory workstation **10** logs onto the Internet **12** and contacts server **14** of the present invention. Server **14** comprises communications hardware and software to communicate over the Internet. Additionally, server **14** comprises software that allows the combination of the output from a CAD program **16** with links to sources of spare parts for any part desired.

Laboratory workstation **10** sends a query to server **14** to determine if the particular type of equipment requiring repair is resident in the CAD program database **18**. Server **14** transmits the inquiry regarding specific equipment to the CAD program **16** which in turn queries its own database **18** to determine if the equipment is present in the database. If the equipment is present, an "exploded view" of the equipment is sent via server **14** back over the Internet **12** to laboratory workstation **10**. Workstation **10** displays the image comprising the exploded view. The image comprising the exploded view can be CAD, digital, or any image format where links may be imbedded. Using indicating means such as a mouse, track ball, touch pad, or any other pointing type device, the buyer of laboratory workstation **10** designates the particular part or sub-assembly that is desired to be purchased or replaced.

Each part displayed to the laboratory workstation **10** comprises an underlying link to the server database **20**. When the buyer indicates a particular part or sub-assembly, a message comprising the link is sent to the server **14** and then to the CAD program **16** to display a more detailed view of the particular part that is desired to be ordered. Simultaneously, the system, via a lookup table or other means, retrieves information from database **20** regarding the source of the particular part is question and pricing information, if any. The system further retrieves information, via a lookup table or other means, from database **20** regarding cross-referenced items, such as parts or information, without limitation. Cross-referenced parts would be parts that may also need replaced in conjunction with the selected part. For instance, o-rings, washers, or a two-centimeter wrench may be needed to properly install the part. Cross-referenced information may include instructions on how to install the part ordered, a reminder that servicing the part is required in a certain number of years, or guarantees that come with the part.

The more detailed diagram of the part that is desired is then displayed on the buyer PC **10**. This page is displayed to the buyer together with an indicator of whether the buyer wishes to buy the part and/or cross-referenced items or not. If the buyer wishes to buy the part(s), the buyer causes the laboratory workstation **10** to send an appropriate message over Internet **12** to server **14**.

Server **14** then places the order from supplier **22**, who is the supplier of the spare part(s) in question. This purchase occurs via methods of electronic commerce known in the art. The part or parts is delivered subsequently to the laboratory workstation location **10**.

Electronic commerce aspects of the present invention take place, as noted above, in a normal fashion. This can comprise laboratory buyer station **10** pre-registering with server **14** with all information necessary to purchase laboratory parts. Alternatively, such information can be provided to server **14** at the time of purchase.

Referring now to **Figure 2**, the communications sequence is illustrated. With the web enabled system of the present invention, as buyer having a laboratory workstation sends an initial query **30** over the Internet to the server of the present invention. The query contains information that allows the server to make a query **32** to the CAD to retrieve the CAD image of a particular piece of equipment. The CAD system which may comprise software that is resident on the server retrieves the CAD image from its database **34**. The database image is then provided back to the CAD system **36**, which in turn provides that image **38** in the form of a web page which is then communicated over the Internet to the buyer's workstation **40**.

This communication process repeats until the specific part in question is identified by the buyer, using the laboratory workstation. Once the appropriate part is identified, an "order" message **42** is sent from the workstation to the server. Information on the specific part is retrieved by the server from the CAD system **44**, which in turn retrieves the precise information, nomenclature, and cross-references from the CAD database **46**. That information is subsequently provided back to the CAD system from the database **48** and thereafter to the server **50** which converts that information into an HTML page to be displayed on the buyer's computer **52**, after transmission over the Internet. When the buyer decides to order the specific part based upon the information received, the buyer places the order **54** to the server of the present invention. The server thereafter orders the part **56** from a third party for subsequent delivery.

Alternatively, the part may be present in the inventory of the organization that is running the server. In that case, the part can subsequently be shipped directly to the laboratory ordering the part.

Referring to **Figure 3**, a typical CAD presentation to the laboratory workstation is illustrated. This illustration indicates the layering of views used to identify a particular piece of equipment. Here, a spectrophotometer is used to illustrate the present invention. First, the scientist is shown a front view of the spectrophotometer **60** at a laboratory workstation (not shown). The front view of the spectrophotometer **60** is a CAD image. Also presented are hyperlinks to retrieve a

back view **62** of the spectrophotometer, or to retrieve the" inside view **64** of the spectrophotometer. If the scientist clicks on the hyperlink to retrieve the inside view **64**, a more detailed image **66**, or "exploded view" with all parts comprising that equipment identified is displayed. To obtain further information, the buyer simply clicks on any one specific part to view a detailed image of the part **68**. The detailed image of the part **68** also has a layered link which provides detailed part information.

Referring to **Figure 4**, when the customer selects the detailed image **68** of Figure 3, detailed information on part availability and pricing and cross-references are displayed **70**. Product images **72, 74** are still available to the buyer on the detailed information page. The product images **72, 74** have hyperlinks which sends the part to an order page or shopping cart of the buyer. In this manner, the buyer can simply click on the part to visually select a part for purchase. The various graphical files are linked to suppliers who have a database of parts inventory and availability. In this fashion, orders are placed in an automated way with a precise part being identified. Further, the present invention allows any ambiguity in part nomenclature to be avoided by simply allowing the buyer to graphically and visually identify the part to be ordered. The parts list **70** alone shows how difficult it would be for an untrained scientist to identify the correct parts without having graphic images available.

The present invention also comprises software that allows cross selling to customers of other parts. For example, the fact that one particular part is ordered may indicate that another part should also be ordered in the near future, such as a consumable part. These cross-selling opportunities are also identified to the buyer so that the buyer can do the most complete ordering when the original spare part is being ordered.

The system of the present invention is implemented on a Windows NT server having a Pentium III type processor, with associated random access memory and storage. The CAD program currently used by the present invention is CAD by Auto Desk. Although this is not meant as a limitation. Other types of CAD systems may also be organized in the same manner as the present invention to allow the process of importing information and cross-linking the data to ordering information.

Referring to **Figures 5A** and **5B**, the operation of one embodiment of the present invention is illustrated. This embodiment addresses operation of the system

and method of the present invention where a buyer can access the spare parts purchasing service directly or through a supplier.

A buyer accesses the Internet **80** to search for products and/or spare parts. The buyer may encounter the desired products and/or spare parts in two ways. Buyer may view parts available through a supplier web page **82** or through a purchasing service web page **88**such as the purchasing service operated by Lab Parts, Inc.

When the buyer searches for the desired parts at the supplier web page **82**, buyer takes several actions. Buyer can browse information about the supplier such as policies, warranties, and the like **84**. Buyer also can choose to browse through graphic images of the available products and parts **86**. Once the buyer chooses to view images, he is linked to the purchase service web page **88**.

Once the buyer is linked to the purchase service web page **88**, the buyer then browses images of products **90.** Once the buyer locates the product he is interested in, the buyer then selects the particular part on the image that he would like to purchase **92.** Where a product has subsystems, each subsystem has embedded hyperlinks within the graphic image that further activate until the buyer reaches the part level. When the user selects the part, the embedded hyperlink brings forward purchasing information **94** such as price and availability.

To order a part, the buyer clicks on the part image **96**. The buyer is shown the cost, supplier and expected shipping date and enters the quantity desired **98**. The buyer then selects an order link to place the order **100**. The purchasing service verifies whether the buyer is a service subscriber **101.** If the buyer is not a service subscriber, he will not be able to enter the order until he becomes a subscriber. If the buyer is a subscriber, the selected products are entered into the buyers shopping cart **102**. The buyer's shopping cart information is stored on the server operated by the purchasing service. The buyer can continue to view products and parts **88** until he is ready to enter a purchase order.

Transaction approval is required in order for the buyer to place the order. A purchasing agent either approves or refuses the transaction **104.** The agent verifies that the buyer has sufficient credit or otherwise is approved to do business with the suppliers of the ordered parts. The purchasing agent notifies the purchasing service of whether the buyer has been approved **106**. If the buyer has been approved, the purchasing service submits the order to each of the designated suppliers **108**.

Because the present invention allows access to a large amount of information, content management is an important issue in implementing the system and method for ordering parts. **Figure 6** illustrates a flow diagram of a content management process of the present invention.

The content management process begins with a request **610** for either a paper drawing or an AutoCAD-compatible file from the supplier. If the source is a paper drawing **620**, the paper drawing is edited **622**, scanned **624** to obtain a raster image **626** that is either manually or automatically converted to a vector image **628** for input as an AutoCAD compatible drawing **632**.

If the source is not a paper drawing **621**, the next step is to check if the source is in an AutoCAD-compatible format **630**. If it is not in an AutoCAD-compatible format, a request **610** is made for either a paper drawing or an AutoCAD-compatible file from the supplier. For AutoCAD-compatible drawings **632**, the next step is to clean up the drawing by removing extraneous information **633** to produce a clean drawing **634**. A bill of materials **635** can then be used to define objects and callouts **636** to produce a baseline "DraWinG" file **637** in AutoCAD's native file format (DWG-format) with objects defined. The typical DWG file is of high resolution and produces a file that is larger than a "Drawing Web Format" or DWF file of AutoDesk's proposed standard format for sharing CAD drawings over the Internet.

Once the baseline DWG-format file **637** is obtained, the content manager program can be executed **638** to obtain a smaller DWF file **640**, a default Graphics Interchange Format (GIF) image file of the part **650** and the database entries **660**.

The content manager application of the present invention is a program written to take baseline DWGs created in AutoCAD and automatically generate the associated Hyperlinks, DWFs, GIFs, and database entries used by the present invention. Due to the fact that these generated items need to be transferred to a web server, it may be preferable to have the actual placement of files be attended by an operator, with no automation for the final placement of files. However, the content manager application automatically creates all necessary files. **Figure 7** illustrates a typical embodiment of the main window of the application.

The general flow of action through the content manager application is illustrated in the additional application screenshots of **figures 8-12** in the following manner:

1. Load all AutoCAD documents (DWGs) – this takes place automatically if the documents are in an Input Directory specified in content manager application, as set in the File Locations tab of the Options window, illustrated in **figure 11**.
2. Update the product information data from within content manager application, as shown in the Product Information portion of the main window in **figures 8** (for "instrument" LPI-0001-FP) and **figure 9** (for "subassembly" LP-0001-FA-031C of "instrument" LPI-0001-FP). This is typically manual data entry, however the program could also be modified to accept XML input, so, in the future, the data could be received directly from the supplier.
3. Execute the automated content manager application procedures, which will create the DWF files, a database input file, and default GIF images. This can be accomplished by selecting the appropriate radio buttons in the main window (see **figure 9**) or by selecting the Options button in the main window and selecting the appropriate Default Actions from pull-down menus under the General tab of the Options window, as illustrated in **figure 10**.
4. Upload the DWF files and GIF images to the web server and copy to the appropriate directories.
5. Upload the database input file and copy to the appropriate directory.
6. The UpdateDatabase procedure will be set up as a Scheduled Task on the server, so it will run automatically at a certain time of day (likely at a slow time, however the load it exerts is not a barrier to running the procedure at any time).

The Options screen of **figures 10** and **11** is accessed through the main content manager application screen (**figures 7-9**) with the Options button in the lower right corner of the screen. On the Options screen, the user can set the input and output directories, the hyperlinks to insert into the drawings, and the default actions to take when running the content manager application.

Under the Default Actions of the General tab, the user can specify whether the content manager application will perform each specified action on all loaded documents, selected documents, or none of the documents by default. The default actions can be applied to the generation of DWF files, the GIF images or the hyperlinks.

Hyperlinks specifies the string to insert into the DWF files when linking to the associated parts or subassemblies (which are drawings). The Hyperlink For Drawings

option specifies what text to insert as the URL for objects that are recognized as Drawings. The Hyperlink For Parts option specifies what text to insert as the URL for objects that are recognized as Parts. Both of these options will be the exact text that will be inserted as the URL, with the exception of the pound sign "#" signifying that the name of the object will be substituted there.

Objects are recognized as Drawings if a DWG file exists in the input directory bearing the name of the object. Drawings only exist for subassemblies. If no drawing exists in the input directory (i.e., no "LP-0001-333182-160.dwg" is in the input directory while we're looking at an object named LP-0001-333182-160), it is assumed that this object is a Part.

The File Locations tab has an Input Directory entry that specifies where to look for the DWG files that need to converted, and also specifies where the existing product information flat file (e.g., "Products.System") is, if it exists. The Output Directory under the File Locations tab specifies where the DWF and GIF output files will be written. Any existing files will always be overwritten without any sort of notification.

The main screen of the content manager application contains data entry fields for each product contained in the drawings. An entry is automatically inserted if none exists when the item is selected from the Defined Objects list box. Each object is named in the drawings by the product id of the object. The fields that need to be entered are as follows:

- *ProductID* – This is entered by default, since this must match up with the object name
- *SKU* – This is the supplier's SKU, which can be extracted from the ProductID. The ProductID is a System prefix, consisting of a System identifier ("LP"), followed by the supplier id, then followed by the supplier's SKU. Hence, an SKU can be determined by removing the "LP-xxxx-" prefix.
- *Name* – The name is the name of the part, and can be any text string up to 80 characters. The name will also be used in the hyperlink as the text displayed in the status bar (the bar at the bottom of the browser window).
- *Description* – This is a short description of the product, and can be any text string up to 100 characters in length. This will be displayed on the product information page when a user chooses to view information about a part.

- *Applications* – To add an application, click the Add button directly under the Applications list box and enter a string in the resulting input box. An application can be any string to specify how the product would be used. Applications will very likely be a selected from a set group of applications by the system, however content manager application allows any text to be entered into this box. This text will be used from the main product search page, and displayed in the product detail page. To remove an application, select the application from the Applications list box and click the Remove button directly underneath the Applications list box.
- *Child Products* – A child product is added by clicking the Add button directly under the Child Products list box and entering the ProductID of the child product, and can be removed by selecting the child product to remove from the list box and clicking the Remove button under the Child Products list box. A child product needs to be specified for each product that is a direct component of the product being edited. Child Products will only exist for Instruments and Sub-Assemblies. For example, a catapult would be an instrument, and its child products would be the launcher, that pulley thing to pull down the launcher, the lever to lock it down and launch it. The pulley may be sold as a sub-assembly containing child products such as the chain that actually does the pulling, the wheel the chain wraps around, etc.
- *Related Products* – Related Products are added by clicking the Add button underneath the Related Products list box and entering a ProductID of a related product, and they are removed by selecting the product to remove and clicking the Remove button underneath the Related Products list box. Related products are used for cross selling in the Product Detail screen.
- The *Height, Width, Length,* and *Weight* fields are not currently used, but are kept for future functionality of automatically calculating shipping charges.
- *In Stock* –This indicates whether or not the product is actually in stock. This can be tied in to each supplier's system to keep a live status of the product.

After all data is entered for the products, the content manager application is ready to generate all of the files for use on the web site. Pressing the Go button in the lower right corner generates all of the files. As illustrated in **figure 12**, the content manager application can automatically generate lists of missing information. Once everything has been generated (all GIF images and DWF files will be in the output directory specified in Options), it is time to move everything from the output file location to where it goes on the web site.

These files are preferably placed in a supplier specific subdirectory on the web site. In a preferred embodiment, no part of this is automatic until there is an established level of confidence in the system. Until that point, a system operator will copy these files to a test server before being put out on the Internet.

In a typical embodiment of the System web server, the web site is stored at d:\System\development\wwwroot\. To copy the files to the server, the files are sent using FTP to the System web server. Once the files are on the server, an operator connects, such as through Terminal Services, to the web server and copies the files to the appropriate supplier's directories. An example of a supplier's images and drawings directories is as follows:

D:\System\development\wwwroot\supplier\{suppliername}\instruments\images

The above is where the GIF images would go.

D:\System\development\wwwroot\supplier\{suppliername}\instruments\drawings

The above is where the DWF files would go.

To ease importing the data into the database, the data saved from the content manager application is inserted into the database by another program, called UpdateDB. Although this program is intended to run automatically on the server, it can be run interactively. When the program is loaded, the operator can specify the input directory, and then click Run to insert everything into the database. It will automatically log errors to the Event Log if there are any, but you can see any errors in the status list while it runs.

A system and method for Internet based ordering of parts for scientific instruments and other products have been illustrated. It will be apparent to those skilled in the art that using other types of servers and other types of image display software packages are possible without departing from the scope of the invention as disclosed.

We claim:

1.) A system for ordering components comprising:

a user work station connected to the network; and

an order computer having a processor and memory, connected to a network;

wherein the memory of the order computer comprises software instructions for:

accepting a product information request from a user workstation;

displaying images of the product;

providing breakouts of the parts associated with the product in sequential layers of increasing detail;

preparing an order list of desired parts for the user;

cross-linking additional product suggestions based on desired parts on the order list; and

conducting a purchase transaction of the desired parts for the user.

2. The system of claim 1 wherein the memory of the order computer further comprises software instructions for retrieving instructions describing how to install the ordered desired parts.

3. The system of claim 1 wherein the wherein the memory of the order computer further comprises software instructions retrieving a reminder message when the ordered desired parts require servicing and deliver the reminder message to the user.

4. The system of claim 1 wherein the memory of the order computer further comprises software instructions for conducting a purchase transaction for the user through a secondary supplier.

5. The system of claim 1 wherein the memory of the order computer further comprises software instructions for retrieving pre-registered user information for processing an order.

6. The system of claim 1 wherein the images of the product are CAD images.

7. The system of claim 1 wherein the images of the product are digital images.

8. A method of ordering component parts of a product comprising the steps of:

viewing an image of a product on a display screen;

selecting a portion of the product with a pointing means;

viewing a layered image of the portion of the product selected on the display screen;

selecting a component part of the product with a pointing means from the layered image; and

ordering the component part of the product.

9. The method of claim 8 further comprising the step of viewing ordering suggestions derived from the component part ordered.

10. The method of claim 8 further comprising viewing on the display a detailed description and the image of the component part.

11. The method of claim 8 further comprising viewing installation instructions for the component part ordered.

12. The method of claim 8 further comprising ordering the component part of the product from a supplier.

13. The method of claim 8 wherein the images of the product are CAD images.

14. The method of claim 8 wherein the images of the product are digital images.

15. A system for ordering component parts of a product comprising:

a user work station connected to the network; and

an order computer having a processor and memory, connected to a network;

wherein the order computer memory stores a database of sequentially layered image files showing product architecture from full system to component level.

16. The system of claim 15 wherein the order computer memory further comprises a database of additional product suggestions cross-linked to the ordered component part.

17. The system of claim 15 wherein the order computer memory further comprises a database of installation procedures for component parts.

18. The system of claim 15 wherein the order computer memory further comprises a database of maintenance schedules for component parts.

19. The system of claim 15 wherein the order computer memory further comprises instructions for executing transactions for purchasing component parts from a plurality of suppliers connected to the network.

20. The system of claim 15 wherein the order computer memory further comprises a database of pre-registered users.

21. The system of claim 15 wherein the image files are CAD image files.

22. The system of claim 15 wherein the image files are digital image files.

23. A system for ordering component parts of a product comprising:

a user work station connected to the network; and

an order computer having a processor and memory, connected to a network;

wherein the order computer stores cross-linked databases for providing the user

with suggestions for additional parts or products related to an ordered component part.

24. The system of claim 23 wherein the component part and additional parts are displayed at the user work station in sequentially layered images.

25. The system of claim 24 wherein the images are CAD images.

26. The system of claim 24 wherein the images are digital images.

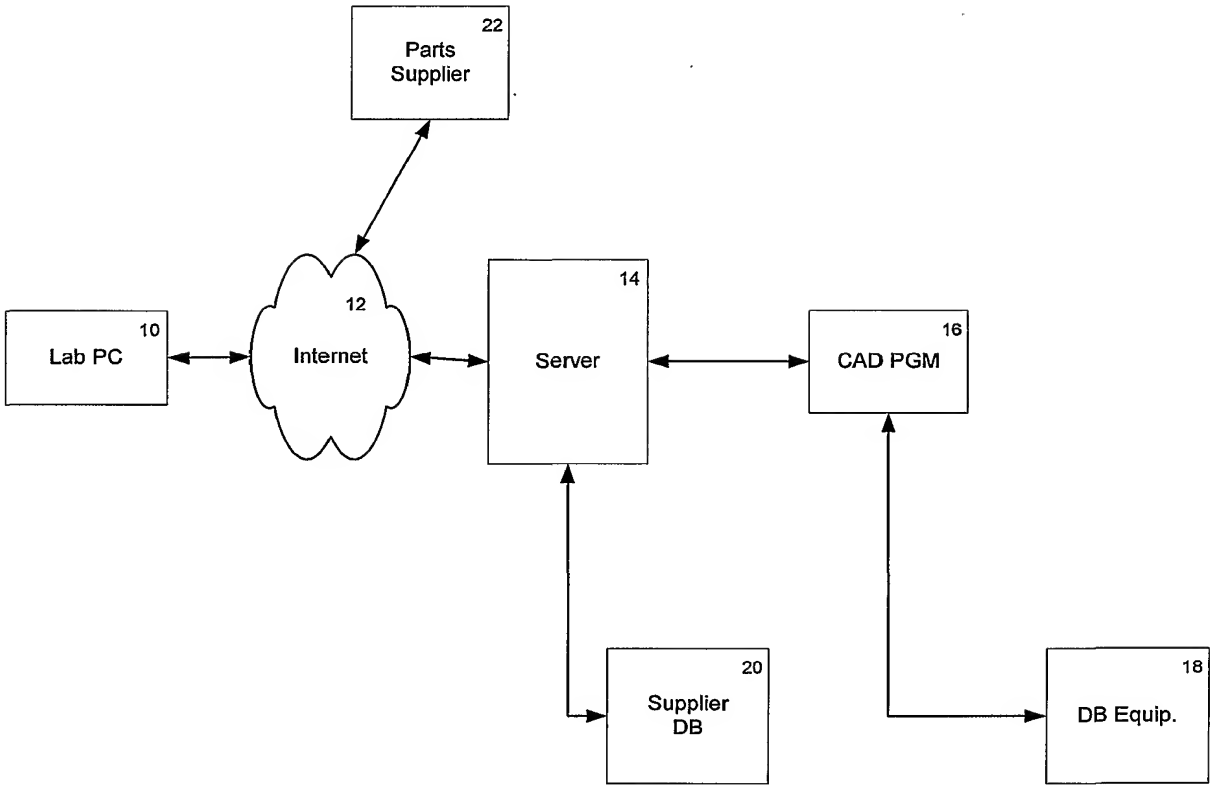

22
Parts Supplier
12
Internet
14
Server
10
Lab PC
16
CAD PGM
20
Supplier DB
18
DB Equip.

FIGURE 1

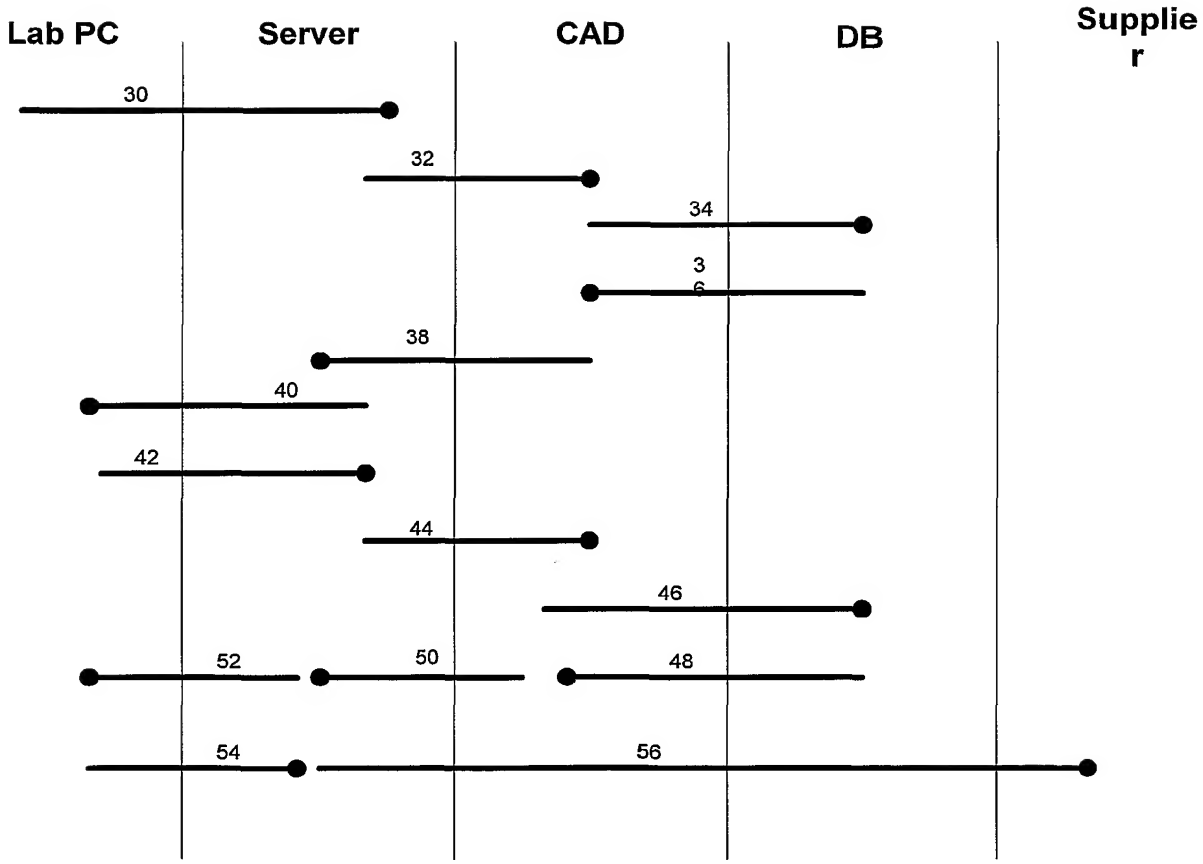

Lab PC
Server
CAD
DB
Supplie
r
30
32
34
3
6
38
40
42
44
46
52
50
48
54
56

FIGURE 2

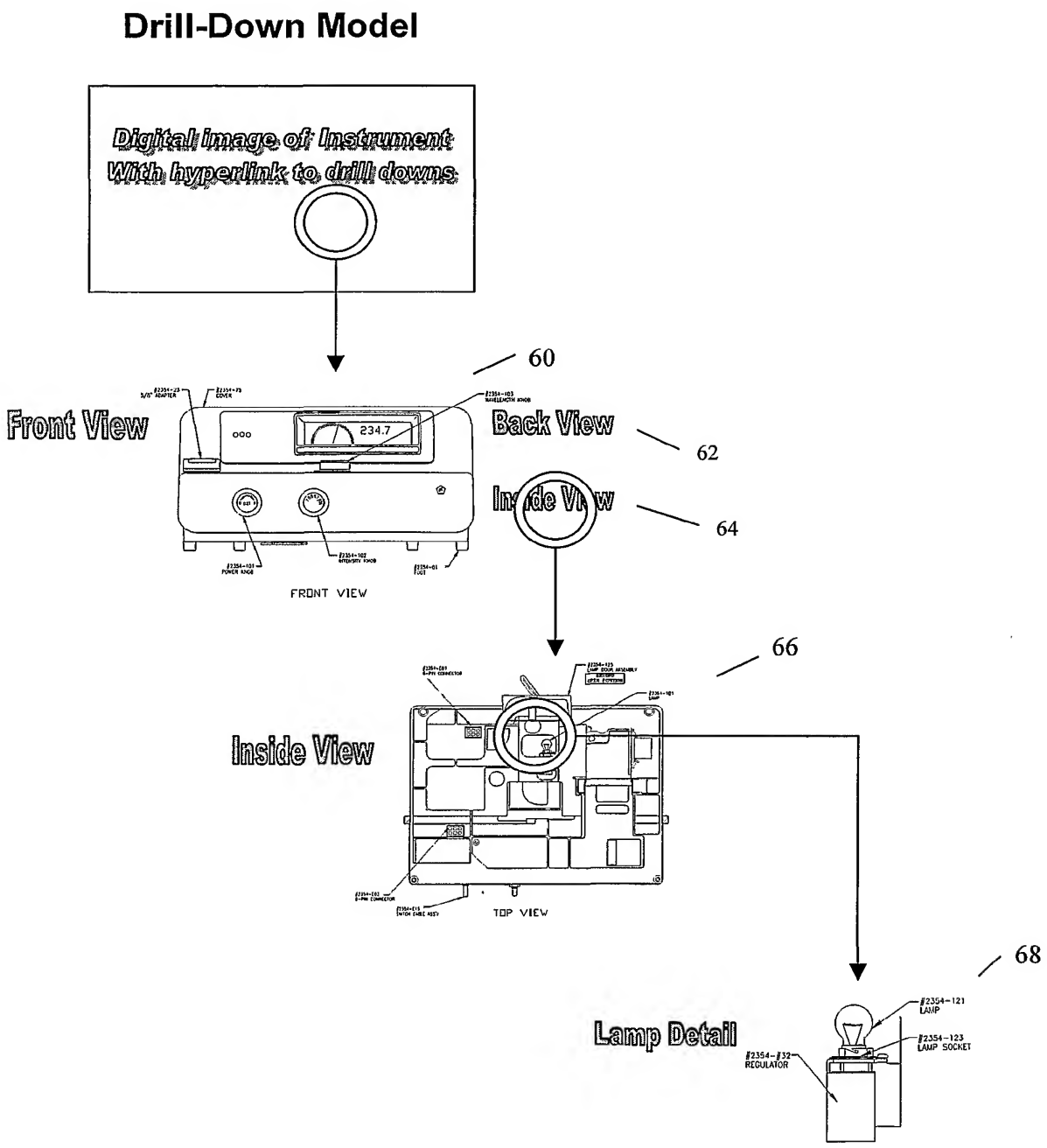

Drill-Down Model
Digital image of Instrument
With hyperlink to drill downs
60
Front View
Back View
62
Inside View
64
FRONT VIEW
66
Inside View
TOP VIEW
68
Lamp Detail
#2354-121
LAMP
#2354-123
LAMP SOCKET
#2354-#32
REGULATOR

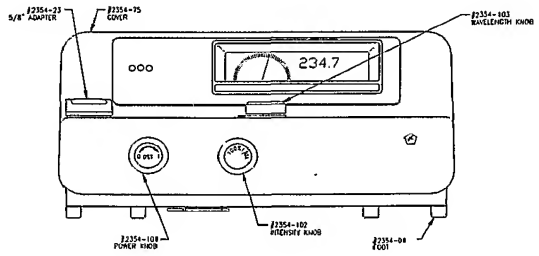
FIGURE 3

ASTROID - Spectrophotometer Spare Parts Catalog

70

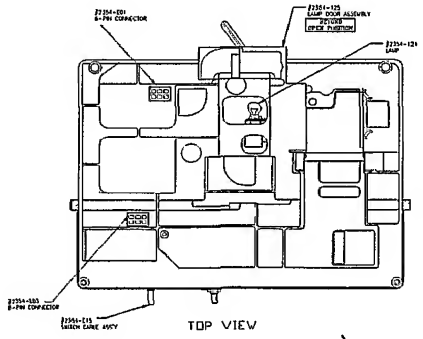
Model 2354 LX-200

Part No.	Catalog No.	SKU No.	Description	Qty.	Weight
2354-001	C2354-001	Sk2354-001	Cover Assembly	1	.75
2354-002	C2354-002	Sk2354-002	Transmission Switch	1	1.45
2354-003	C2354-003	Sk2354-003	Light Fixture	1	.025
2354-004	C2354-004	Sk2354-004	Open Ended wiring Harness	1	.58
2354-005	C2354-005	Sk2354-005	Mirror Assembly	2	2.7
2354-006	C2354-006	Sk2354-006	Internal Voltage Regulator	1	9.5
2354-007	C2354-007	Sk2354-007	Transducer	1	.45
2354-008	C2354-008	Sk2354-008	Power Wiring Harness	3	.76
2354-009	C2354-009	Sk2354-009	Power Cord	1	.23
2354-010	C2354-010	Sk2354-010	Power Knob	1	.17
2354-011	C2354-011	Sk2354-011	Rubber Foot	1	.42
2354-012	C2354-012	Sk2354-012	LED Window	15	.16
2354-013	C2354-013	Sk2354-013	Illuminator Filament	2	.25
2354-014	C2354-014	Sk2354-014	Illuminator Lens	3	.14
2354-015	C2354-015	Sk2354-015	Fusible Link	1	.12
2354-016	C2354-016	Sk2354-016	Access Door	1	.27
2354-017	C2354-017	Sk2354-017	Access Door Hinge	1	.35
2354-018	C2354-018	Sk2354-018	Primary Circuit Board	7	1.59
2354-019	C2354-019	Sk2354-019	Fuse Holder	1	13.07
2354-020	C2354-020	Sk2354-020	Mirror Adjust Bracket	3	.24
2354-021	C2354-021	Sk2354-021	Mirror Adjust Spring	2	.53
2354-022	C2354-022	Sk2354-022	Meter Assembly	1	.78
2354-023	C2354-023	Sk2354-023	Meter Baffle	1	6.35



FRONT VIEW

72



TOP VIEW

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FIGURE 4

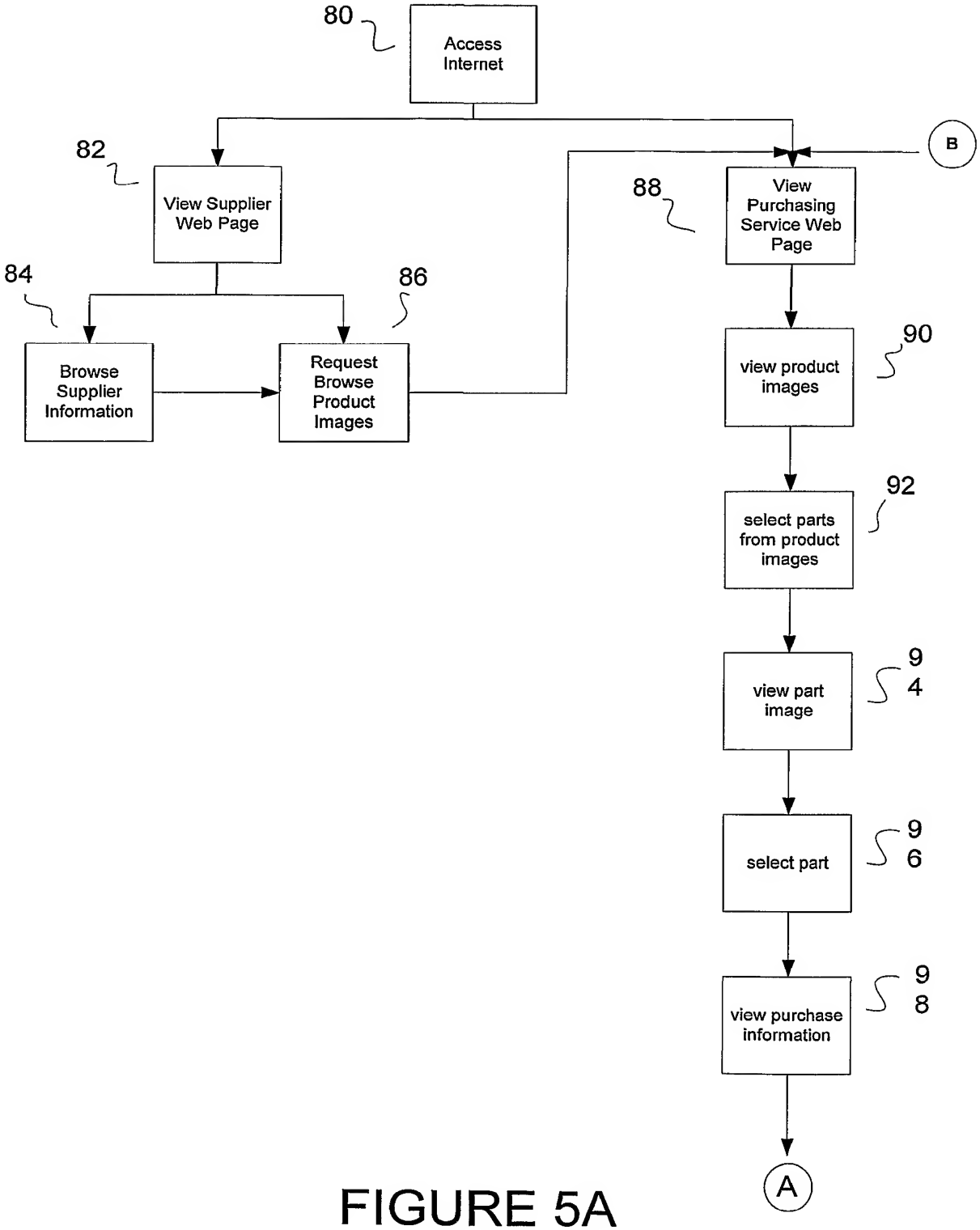
80
Access Internet
82
View Supplier Web Page
84
86
Browse Supplier Information
Request Browse Product Images
B
88
View Purchasing Service Web Page
90
view product images
92
select parts from product images
94
view part image
96
select part
98
view purchase information
A

FIGURE 5A

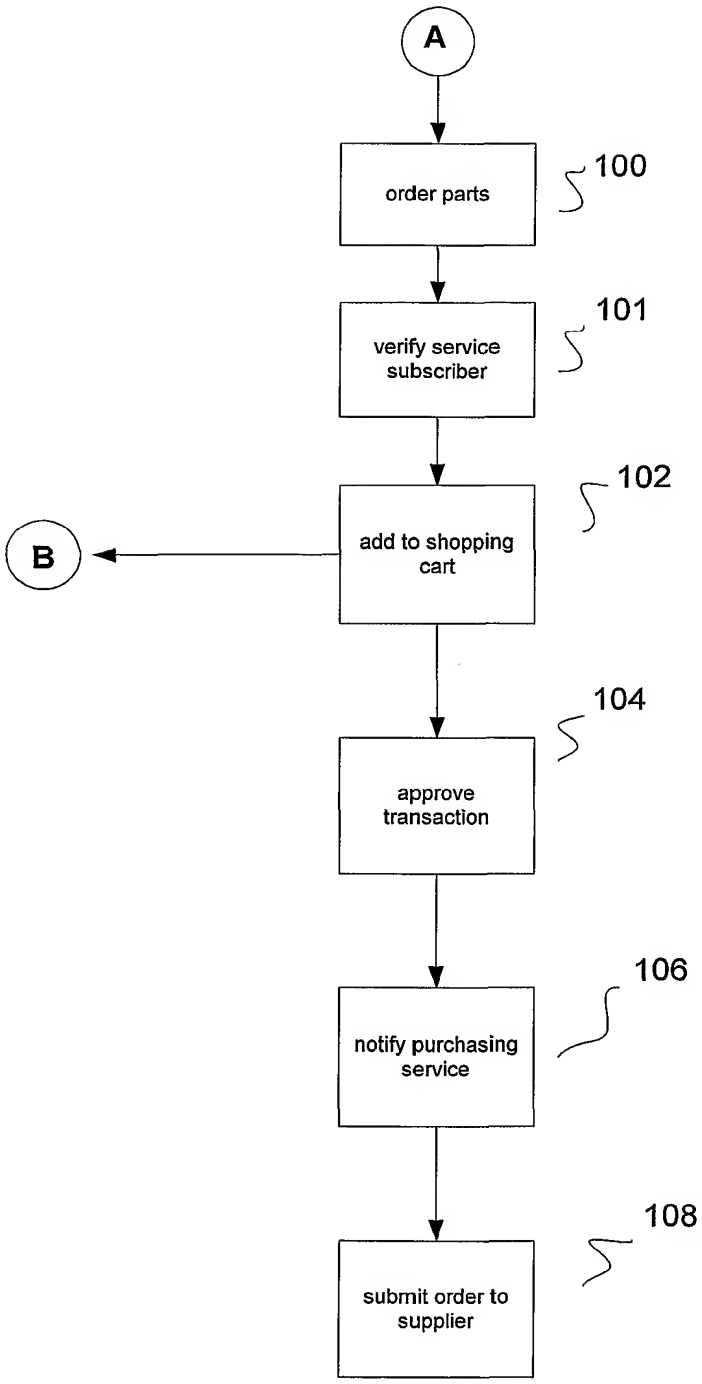
A
order parts
100
verify service subscriber
101
add to shopping cart
102
B
approve transaction
104
notify purchasing service
106
submit order to supplier
108

FIGURE 5B

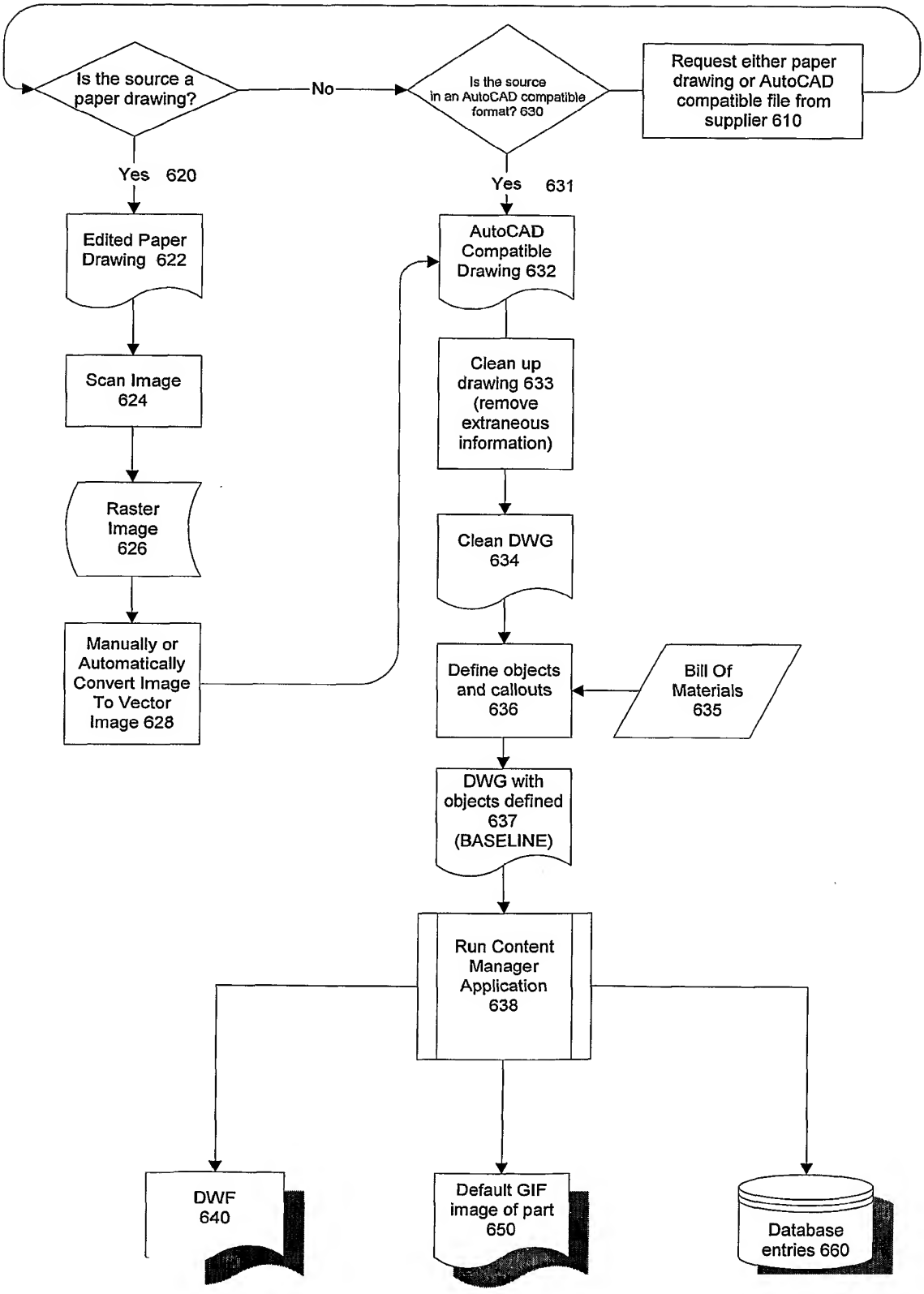
Is the source a paper drawing?
No
Is the source in an AutoCAD compatible format? 630
Request either paper drawing or AutoCAD compatible file from supplier 610
Yes 620
Yes 631
Edited Paper Drawing 622
AutoCAD Compatible Drawing 632
Scan Image 624
Clean up drawing 633 (remove extraneous information)
Raster Image 626
Clean DWG 634
Manually or Automatically Convert Image To Vector Image 628
Define objects and callouts 636
Bill Of Materials 635
DWG with objects defined 637 (BASELINE)
Run Content Manager Application 638
DWF 640
Default GIF image of part 650
Database entries 660

FIGURE 6

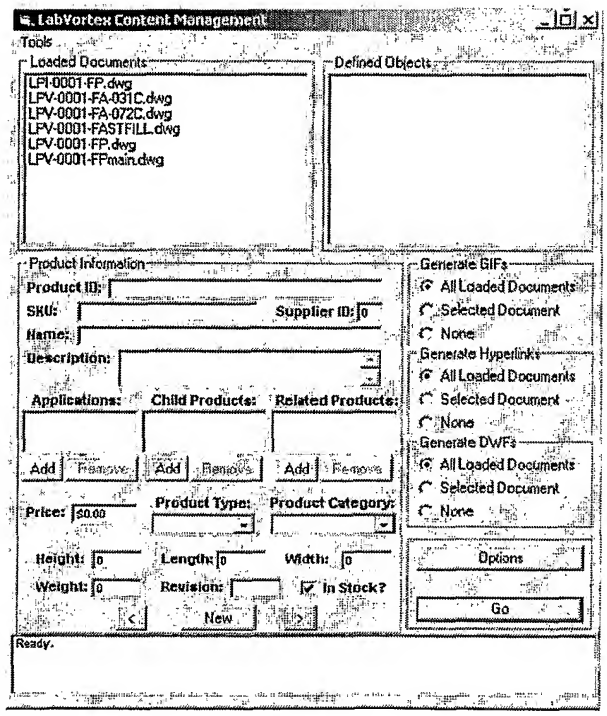
LabVortex Content Management
Tools
Loaded Documents
LPI-0001-FP.dwg
LPV-0001-FA-031C.dwg
LPV-0001-FA-072C.dwg
LPV-0001-FASTFILL.dwg
LPV-0001-FP.dwg
LPV-0001-FPmain.dwg
Defined Objects
Product Information
Product ID:
SKU:
Supplier ID: 0
Name:
Description:
Applications:
Child Products:
Related Products:
Add
Remove
Add
Remove
Add
Remove
Price: $0.00
Product Type:
Product Category:
Height: 0
Length: 0
Width: 0
Weight: 0
Revision:
In Stock?
<
New
>
Generate GIFs
All Loaded Documents
Selected Document
None
Generate Hyperlinks
All Loaded Documents
Selected Document
None
Generate DWFs
All Loaded Documents
Selected Document
None
Options
Go
Ready.

FIGURE 7

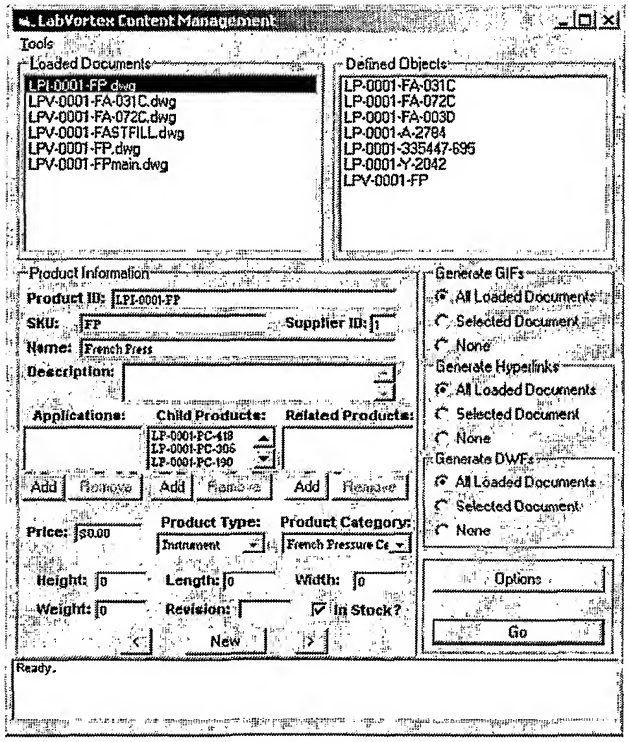
LabVortex Content Management
Tools
Loaded Documents
LPI-0001-FP.dwg
LPV-0001-FA-031C.dwg
LPV-0001-FA-072C.dwg
LPV-0001-FASTFILL.dwg
LPV-0001-FP.dwg
LPV-0001-FPmain.dwg
Defined Objects
LP-0001-FA-031C
LP-0001-FA-072C
LP-0001-FA-003D
LP-0001-A-2784
LP-0001-335447-695
LP-0001-Y-2042
LPV-0001-FP
Product Information
Product ID: LPI-0001-FP
SKU: FP
Supplier ID: 1
Name: French Press
Description:
Applications:
Child Products:
Related Products:
LP-0001-PC-418
LP-0001-PC-305
LP-0001-PC-190
Add
Remove
Add
Remove
Add
Remove
Price: $0.00
Product Type:
Instrument
Product Category:
French Pressure Ca
Height: 0
Length: 0
Width: 0
Weight: 0
Revision:
In Stock?
New
Generate GIFs
All Loaded Documents
Selected Document
None
Generate Hyperlinks
All Loaded Documents
Selected Document
None
Generate DWFs
All Loaded Documents
Selected Document
None
Options
Go
Ready.

FIGURE 8

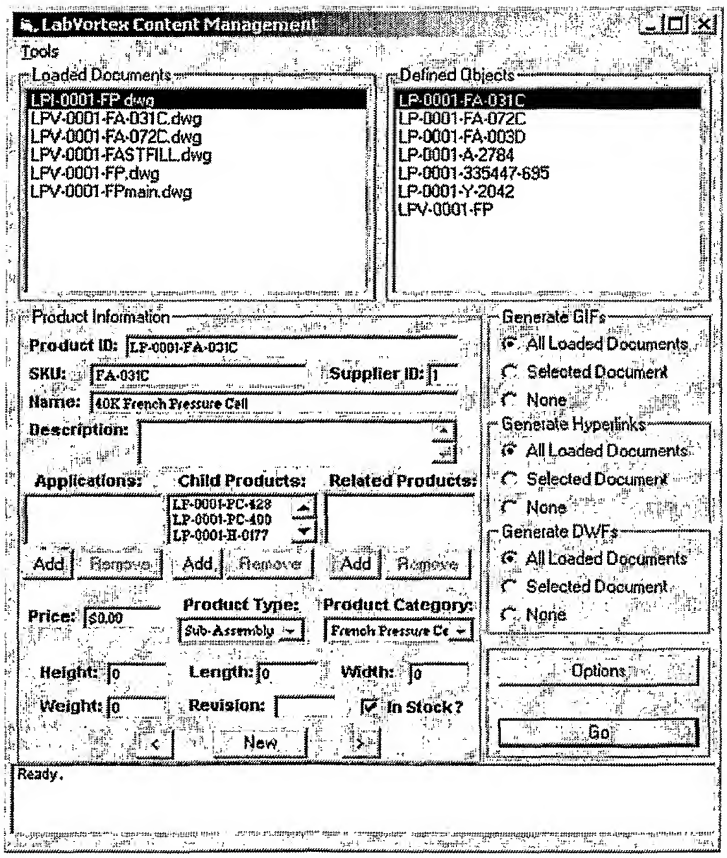
LabVortex Content Management
Tools
Loaded Documents
LPI-0001-FP.dwg
LPV-0001-FA-031C.dwg
LPV-0001-FA-072C.dwg
LPV-0001-FASTFILL.dwg
LPV-0001-FP.dwg
LPV-0001-FPmain.dwg
Defined Objects
LP-0001-FA-031C
LP-0001-FA-072C
LP-0001-FA-003D
LP-0001-A-2784
LP-0001-335447-695
LP-0001-Y-2042
LPV-0001-FP
Product Information
Product ID: LP-0001-FA-031C
SKU: FA-031C
Supplier ID: 1
Name: 40K French Pressure Cell
Description:
Applications:
Child Products:
LP-0001-PC-428
LP-0001-PC-400
LP-0001-H-0177
Related Products:
Add
Remove
Add
Remove
Add
Remove
Price: $0.00
Product Type:
Sub-Assembly
Product Category:
French Pressure Ce
Height: 0
Length: 0
Width: 0
Weight: 0
Revision:
In Stock?
<
New
>
Generate GIFs
All Loaded Documents
Selected Document
None
Generate Hyperlinks
All Loaded Documents
Selected Document
None
Generate DWFs
All Loaded Documents
Selected Document
None
Options
Go
Ready.

FIGURE 9

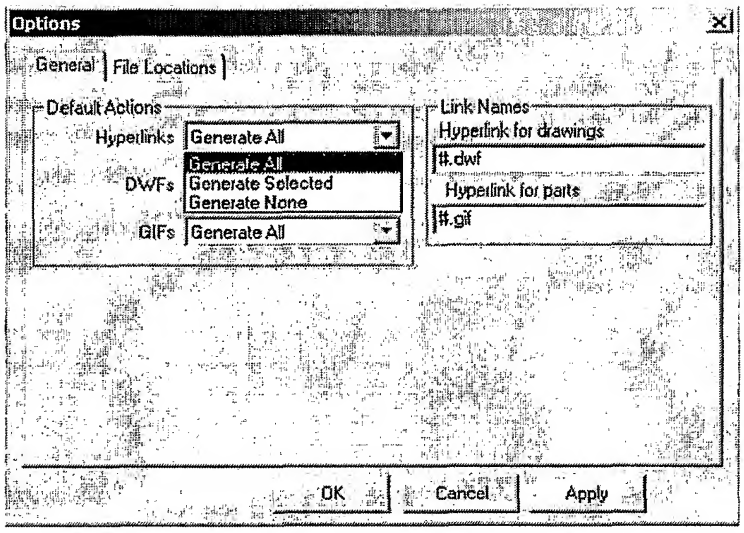
Options
General
File Locations
Default Actions
Hyperlinks
Generate All
DWFs
Generate All
Generate Selected
Generate None
GIFs
Generate All
Link Names
Hyperlink for drawings
#.dwf
Hyperlink for parts
#.gif
OK
Cancel
Apply

FIGURE 10

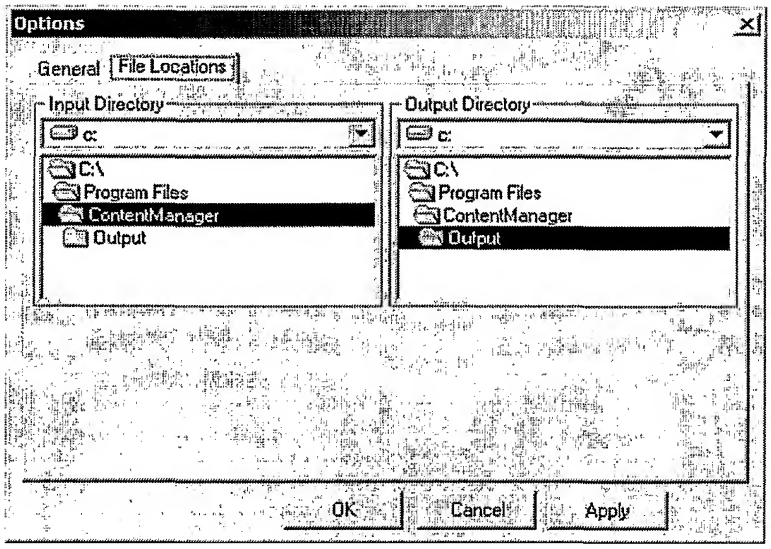
Options
General
File Locations
Input Directory
c:
C:\
Program Files
ContentManager
Output
Output Directory
c:
C:\
Program Files
ContentManager
Output
OK
Cancel
Apply

FIGURE 11

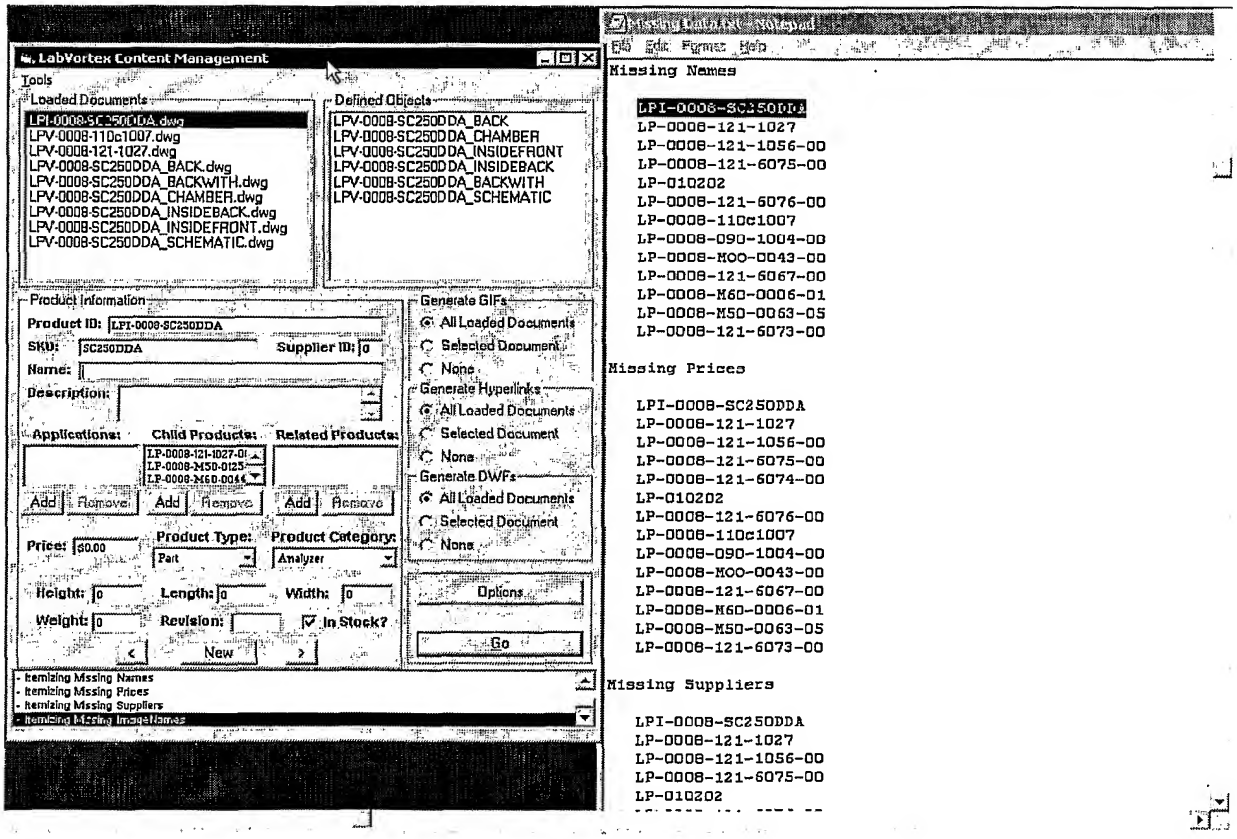
LabVortex Content Management
Tools
Loaded Documents
LPI-0008-SC250DDA.dwg
LPV-0008-110c1007.dwg
LPV-0008-121-1027.dwg
LPV-0008-SC250DDA_BACK.dwg
LPV-0008-SC250DDA_BACKWITH.dwg
LPV-0008-SC250DDA_CHAMBER.dwg
LPV-0008-SC250DDA_INSIDEBACK.dwg
LPV-0008-SC250DDA_INSIDEFRONT.dwg
LPV-0008-SC250DDA_SCHEMATIC.dwg
Defined Objects
LPV-0008-SC250DDA_BACK
LPV-0008-SC250DDA_CHAMBER
LPV-0008-SC250DDA_INSIDEFRONT
LPV-0008-SC250DDA_INSIDEBACK
LPV-0008-SC250DDA_BACKWITH
LPV-0008-SC250DDA_SCHEMATIC
Product Information
Product ID: LPI-0008-SC250DDA
SKU: SC250DDA
Supplier ID: 0
Name:
Description:
Applications:
Child Products:
Related Products:
Add
Remove
Price: $0.00
Product Type:
Part
Product Category:
Analyzer
Height: 0
Length: 0
Width: 0
Weight: 0
Revision:
In Stock?
New
Generate GIFs
All Loaded Documents
Selected Document
None
Generate Hyperlinks
Generate DWFs
Options
Go
- Itemizing Missing Names
- Itemizing Missing Prices
- Itemizing Missing Suppliers
- Itemizing Missing ImageNames
Missing Names
LPI-0008-SC250DDA
LP-0008-121-1027
LP-0008-121-1056-00
LP-0008-121-6075-00
LP-010202
LP-0008-121-6076-00
LP-0008-110c1007
LP-0008-090-1004-00
LP-0008-M00-0043-00
LP-0008-121-6067-00
LP-0008-M60-0006-01
LP-0008-M50-0063-05
LP-0008-121-6073-00
Missing Prices
LPI-0008-SC250DDA
LP-0008-121-1027
LP-0008-121-1056-00
LP-0008-121-6075-00
LP-0008-121-6074-00
LP-010202
LP-0008-121-6076-00
LP-0008-110c1007
LP-0008-090-1004-00
LP-0008-M00-0043-00
LP-0008-121-6067-00
LP-0008-M60-0006-01
LP-0008-M50-0063-05
LP-0008-121-6073-00
Missing Suppliers
LPI-0008-SC250DDA
LP-0008-121-1027
LP-0008-121-1056-00
LP-0008-121-6075-00
LP-010202

FIGURE 12